M/035/009

DEPARTMENT OF HEALTH
DIVISION OF ENVIRONMENTAL HEALTH

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January 30, 1989

Mr. R.J. Ramsey
Barney's Canyon Mine
P.O. Box 311
Bingham Canyon, Utah 84006-0311

Re: B.P. Minerals
Barney's Canyon Project
Plan Review Comments

Dear Mr. Ramsey:

We have reviewed the plans received on 4 January 1989 for the Barney's Canyon Gold heap leach project and have the following comments:

1. Drawing 1-00-104

   a. Additional information concerning protection of the flexible membrane from the weight of the process solution pond submersible pumps and pump suction must be provided for review.

   b. Additional information about the gravel filter must be provided.

   c. The procedure for placing submersible pumps and removal for repair must be submitted for review.

   d. If process pond depth indicators are to be installed the design must be submitted for review.

2. Drawing 2-02-200

   a. Details of the domestic wastewater disposal facilities must be submitted to the Salt Lake City/County Health Department for review.

   b. Details of the solvent and grease handling and disposal facilities for the truck shop must be submitted for review.

   c. We understand that the date indicated for each heap leach pad is the proposed operational activation date. A schedule must be submitted for review stating the approximate dates for construction of all heap leach pads. This schedule must contain sufficient detail to establish substantial continuous construction of the heap leach pad if the construction permit is expected to cover the entire project.

3. Drawing 2-02-201

   a. The flexible membrane for the lined process piping trench must not allow any field seams in the bottom of the trench running the length of the trench. The plans and specifications must state that the shingle effect be utilized in all transverse seams.

   b. Sufficient detail must be provided to insure that surface runoff will not enter any of the process piping containment ditches or containment piping.

   c. Details must be provided which show that discharge from process piping containment ditches and containment pipes will be acceptably contained.

   d. The west end of heap leach pad BC-1 shows no perimeter berm to contain leaching solution or ore. If this approach is to be used the west toe of the ore pile must be indicated on this drawing for review.

4. Drawing 2-02-202

   a. Section C and D on this drawing show the divider berm 1.5 feet high while Section E shows the divider berm 3.5 feet high. This must be clarified throughout the plans.

   b. The monitoring wells must be shown on drawing 2-02-200.

   c. It is noted that the drawing shows the leak detection system base eight (8) inches thick whereas the design criteria requires only six (6) inches.

   d. It should be reflected throughout the plans that wherever the six (6)-inch thick leak detection media terminates on the down hill side of a pad a collector line be placed.

5. Drawing 2-02-203

   a. The grading tolerance for the surface of the leak detection system base must be defined so no ponding of leakage can occur, i.e., constant negative grade.

6. Drawing 2-02-205

   a. Provisions should be made so that liquids backing up in the flume building will discharge into the process piping containment ditch, if the 18-inch flume building discharge pipe plugs.

7. Drawing 2-06-602

   a. Details of the barren return sump must be provided for review.

8. Drawing 2-06-606

   a. To establish the containment requirement for the process plant area, a list of all reagents and quantities of each which will be used must be submitted for review.

9. Drawing 2-06-610

   a. The trench to which the Booster pump house sump will drain to must be defined.

b. The slope of the Booster pump house floor towards the sump should be specified.

10. Drawing 3-06-600

a. Provisions for measuring the depth of silt settled behind the desilting berm must be shown.

b. The operation and maintenance manual, which must be approved prior to initiation of operations, must indicate the maximum allowable silt depth which will be allowed and what is cleaning action is required.

c. We understand that storage area B will not be used for the storage of reagents.

d. We understand from the 4 January 1989 transmittal letter (page 7) that storage area A will be used as the reagent storage yard. The following information must be provided for review.

(i) Reagents which will be stored must be specified
(ii) Details of the storage area which will contain spills, leaks, etc., must be provided for review such as containment berms, liners, conveyance to process pond etc.

e. The area and estimated run off from storage area A or any other area other than heap leach pads which will drain into the process ponds must be provided for review.

f. We understand that the two (2) desilting sumps with piping into the process ponds are being constructed now to receive pregnant liquor lines from future heap leach pads. Details of the secure provisions which prevent the inflow of surface runoff must be provided for review.

g. Drawing 3-06-606 was not found with the submittal.

h. We understand per our meeting of 4 January 1989 that there is no inter-connecting piping between the desilting pond emergency overflow pipe and the desilting sump on the southeast corner of the pregnant pond.

12. Drawing 3-06-602

a. The bottom of the leak detection sump for both process solution ponds should slope to the point of collection.

b. The operation and maintenance manual must be approved prior to initiation of operations and must define how the leak detection sump will be monitored.

c. The quality of the PVC leak detection sump pipe for the process ponds must be specified to insure its integrity throughout the life of the project.

13. Drawing 7-02-201

a. The material of the 2-inch diameter perforated leak detection pipe should be specified.

b. Sufficient detail must be provided to establish that leakage conveyed by the 6-inch diameter leak detection collection pipe will be acceptably and adequately contained.

c. A detail showing the orientation of the perforations of the leak detection collection pipe must be provided.

d. Detail No. 3 should show a 3-inch non-perforated ADS pipe instead of a 3-inch perforated ADS pipe.

e. The minimum leak detection collection pipe slope for each section of the heap leach pad to insure flow to the 6-inch collector pipe must be specified.

f. The typical section of the perimeter berm should show the 6-inch leak detection system base extending at least three feet past the transition from perforated leak detection pipe to non-perforated leak detection pipe. The intent is to have the material around the non-perforated pipe prevent leakage from traveling along the outside of this pipe.

g. The gradation of the blanket material which will be placed directly on the flexible membrane must be defined. The maximum particle size of the ore must be defined.

14. Drawing 7-02-202

a. The operation and maintenance manual must be approved prior to initiation of operations and must include a monitoring schedule for existence of fluids for discharge points from all process piping secondary containment systems.

b. The detail of the pregnant solution bypass sump on drawing 3-06-604 must be provided for review.

c. Details concerning the rock filter must be submitted for review.

d. Details of the barren solution by pass sump must be submitted for review.

e. Details of the surge barrier must be submitted for review.

f. Details of the manhole must be submitted for review.

g. Details of the Barren solution header pipe connections must be submitted for review.

h. Details of the Barren Solution spray pipe connection to the Barren Solution Header pipe within 100 feet of the edge of the ore pile must be submitted for review.

i. The operation and maintenance manual, which must be approved prior to initiation of operations, must include details of how storm water drainage from pads which have not been loaded with ore will be collected and directed to the desilting pond.

j. Details of fences and other provisions to keep animals off the pad, pond, and liner ditch flexible membrane during construction, and waterfowl off ponds through out the operating life of the project must be submitted for review.

15. Drawing 7-06-609

    a. Details of all domestic wastewater septic tank systems and all piping covered by the plumbing code must be submitted to the Salt Lake County Health Department for review and approval. The domestic water supply system must be approved by the appropriate regulatory agency.

    b. Details of the manhole which will service the cyanide drainage system and the acid drainage system must be submitted for review.

    c. Details of the barren return sump must be submitted for review.

16. A test pit must be dug in the vicinity of test hole B-5. According to the illustrations, about 20 feet of material was stripped at this site, which would mean that the 6" clay underliner is on sandy gravel. We need to assess the suitability of this material.

The following are clarifications and requests for additional information concerning the 4 January 1989 transmittal letter.

1. On page 4 the letter indicates that the dates shown on drawing 2-02-200 are approximate completion dates. As previously indicated, for the entire project to be included in a single construction permit, substantial continuous construction of the project must occur. We have concerns about the years where no construction is indicated in 1991 and 1993. We also have concerns that one pad is designated as future without any proposed construction date at all. We, therefore, recommend that a construction schedule be submitted which will contain sufficient detail to establish this requirement.

2. On page 5 the letter states that "the pads are currently planned to be built in essentially the same manner." It must be understood that all aspects of the project must be conducted according to the information contained in the approved plans and specifications and the construction permit.

3. Throughout all plans and specifications for this project, references to the secondary clay liner must be 1.0×10^{-7} centimeters per second or less and references to the leak detection system base must be 1.0×10^{-6} centimeters per second or less.

4. The design of the process solution collection system must limit the head on the flexible membrane (primary liner) to twelve (12) inches or less.

5. Details of the provisions to monitor the process solution head on the flexible membrane (primary liner) on all cells of each pad must be submitted for review.

6. The construction permit will be issued only if leak detection systems underlay each pad. If it is B.P. Mineral's intent not to provide leak detection systems under future pads, then the scope of the construction permit must be limited to pad BC-1 only.

7. If the proposal for this project will be changed from a total ore height of 51 feet to a total height of 125 feet, the plans and specifications must reflect this change and adequate documentation of the following concerns must be provided in writing by a qualified professional:

   a. certification that the foundation will be able to support the ore pile without and adverse settlement which could compromise the liner system.

   b. certification that the liner system will be stable at the design slope with an ore pile of this height.

   c. All factors, assumptions, degrees of safety used in arriving at the conclusions upon which these certifications are based must be provided for review.

8. It also must be certified in writing that the clay liner compacted at optimum moisture will not be pressed into the leak detection media.

9. The desilting pond emergency overflow must be capable of passing the 100-year 24-hour storm event.

The following are clarifications and requests for additional information resulting from a review of the correspondence and other communications from the project file to date:

1. An operation schedule must be submitted for the winter shut down of the process ponds to include the following:
   a. Date winter liquid reduction will commence.
   b. Date winter liquid reduction will be completed.
   c. Amount of liquid which will be in the process ponds at the commencement of the winter shutdown period.
   d. Earliest possible date when the winter shut down period will be terminated.

2. With regard to the heap leach pads which will be constructed after BC-1, the following is understood:

   a. Details of future pads in this project will be built according to the details shown in the approved ponds and specifications. Any variation to these details which the Bureau determines to be significant will be sufficient reason to review the design according to the existing criteria or regulations.

   b. The pads which will be constructed after BC-1 must be located better in the plans with relation to physical reference points such as survey monuments etc.

   c. It is understood that the pads constructed after BC-1 will be within a reasonable proximity to the location indicated on the approved plans.

3. It is understood that sulfide ore will not be processed on any heap leach pad unless a separate review of all facilities effected is conducted and a written authorization issued.

4. Monitoring wells must be installed and sampled for review prior to the issuance of a construction permit. The Copperton wells must also be sampled; see our letter 13 September 1988.

5. A brief description of minimum requirements for loading ore on the leach pad flexible membrane must be submitted for review.

6. The following documents must be submitted for review and approved by this Bureau prior to the initiation of operations:

   a. Operation and maintenance manual including schedule for inspecting leak detection sumps retention of these records for inspection, and appropriate notification procedures in case a leak is discovered. All leak detection sumps must be monitored daily through out the life of the project. Written reports of the monitoring results must be monthly for the first 6 months of each facility and then quarterly thereafter. A ground water monitoring well schedule for BC148 and the four additional monitoring wells meeting the minimum requirements of our 15 August 1988 design criteria approval letter must be included.

      Also details of the procedures which will be used to separate process fluids from heap leach pads and runoff from unloaded heap leach pads must be submitted for review.

   b. Contingency plan evaluating all the most probable spill or leakage scenarios for this project and defining acceptable mitigating responses and indicating quantities of resources which must be available on site. Also this plan must require the evaluation of each spill or leak that occurs and requires that corrective action to eliminate such a spill or leak in the future be implemented. It is understood that an acceptable repair of any leak will be achieved when process fluids no longer flow through the liner system.

   c. Closure plans including neutralization criteria for abandonment of heap leach spent ore piles and process ponds.

6. As per comment No. 35 of our 8 June 1988 letter, measures taken to plug drains through the existing railroad grades below the process ponds must be submitted for review.

7. Specifications for the following must be submitted for review and approval prior to the issuance of the construction permit:

   a. Earthwork defining procedures for bentonite addition, gradation specification for leak detection media, requirement for proof rolling clay liner surfaces, etc.

   b. HDPE including frequency of destructive and non-destructive testing, etc.

   c. Process piping including field joint requirement, pipe designation, wall thickness requirements, etc.

8. An evaluation of the potential for rupture of the HDPE primary liner from seismic slope failure must be submitted for review.

9. The transmisivity of the process pond HDPE drain net must be specified.

10. Provisions for storm water runoff control for disturbed areas and ore stock pile areas at the Melco pit must be provided for review.

11. The design life of the entire project, as stated in our 15 August 1988 letter, is 15 years. However, the nature of the materials of construction, i.e. HDPE liner, limits the design life of individual units of the project to a maximum of ten (10) years. The HDPE liner for the process ponds must be inspected annually, after te (10) years of service, prior to the spring start up. A written evaluation of the HDPE liner must be submitted to this Bureau within 30 days after the inspection.

12. It is requested that records of a water balance for all project process fluids be kep throughout the life of the project be included as part of the operation and maintenance manual requirements.

13. We are concerned as a result of our 4 January 1989 meeting that the 12-inch maximum head limit for process fluids on the flexible membrane may be exceeded. If there is any concern in this regard the design must take a more conservative approval to insure that the 12-inch maximum limit will not be exceeded.

14. A construction procedure to insure the continuity of the leak detection media to insure it will function properly must be presented for review.

15. Prior to the issuance of a construction permit, a summary of all quality assurance work conducted on the 6-inch leak detection system base for heap leach pad BC-1 must be submitted for review and acceptance.

16. The leak detection collection pipe must have openings smaller than 75 percent of the leak detection media.

17. It must be indicated if there is a drain from the chemical storage area, identified as 110 on drawing 7-06-609, to the barren pond. If there is no drain, please identify the elements which will be stored.

18. The potential for liquid discharging off the heap leach pad flexible liner surface and into the groundwater system after neutralization and reclamation when the 25-year snow pack and 25-year spring storm event occur simultaneously must be evaluated and submitted for review.

19. Written certification and documentation must be submitted for review concerning the ore body set back from the edge of the heap leach pad to ensure containment of ore being leached on the pad liner system.

20. The assumption that only the heap leach pad actively being leached will produce water as a result of the design storm event is acceptable only if the operation and maintenance manual defines procedures which will insure that drain down of the previously leached pad is complete before the leaching of the next pad commences.

21. The design of the process ponds capacity to hold the 24-hour drain down instead of a complete drain down is based on our understanding that two independent power sources, Kennecott and UP&L, supply power to this project. However, sufficient spare pumps, parts and other appurtenances must be specified in the operation and maintenance manual to be on site and ready for use through out life of the project.

22. If the heap leach pad ore height will be increased from three seventeen-foot lifts to three fourty-one-foot lifts, the process pond capacity must be reevaluated.

23. The operation and maintenance manual, the contingency plan and the closure plan will be required by conditions of the construction permit to be submitted for review and approval prior to initiation of operations.

24. You may be required to submit chemical information to state and other agencies under the federal emergency planning and community right to know act.

The plans should be revised and submitted for further review.

These review comments are based upon the first plan submittal and do not include any review of project specifications. It is our recommendation that the project should not be bid based upon unapproved plans and specifications. The Bureau also recommends not entering into any contractual agreement on this project until the construction permit is issued.

Furthermore, B.P. Minerals will assume responsibility for any cost incurred, delays or other impacts on this project resulting from action not consistent with the above recommendations.

Please call Mack Croft or Charlie Dietz of my staff if there are any questions.

Sincerely,

Utah Water Pollution Control Committee

Don A. Ostler, P.E.
Executive Secretary

cc: Mr. G.D. Schurtz, B.P. Minerals
Mr. L.J. Jacobsen, Barney's Canyon Gold Project
Mr. Brian Buck, JBR Consultants
Mr. Kent Miner, Salt Lake City/County Health Department
Mr. Lowell Braxton, Division of Oil, Gas, & Mining
Mr. Ross Pino, 310 East State Highway, Copperton, Utah 84006
Mr. Blaine Milner, Chairman, Copperton Improvement District, Copperton

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